William Finley

Facilities Management

University of North Carolina at Charlotte – Building 55

9151 Cameron Blvd

Charlotte NC 28223

**PROJECT**: Friday HVAC & Controls

***Commissioning Services***

**Code 42126, Item 311**

Thank you for your interest in the subject project. This information is being provided to all firms which express an interest in the commissioning of the project. Limit the size of your submittal document to no greater than forty (40) pages (20 pages when printing double sided), 12½ inches in height and 9½ inches in width. Submittals are due in this office by 2:00 p.m., October 10th, 2023. **Do not transmit any submittal information via email.**

The University is seeking an engineering firm which is capable of reviewing design documents, preparing commissioning specifications and inspecting constructed facilities to ensure proper Mechanical, Electrical, and Plumbing commissioning of the facility described in the attachment. The selected firm will coordinate commissioning efforts with the project design engineer, McKim & Creed.

Submittals are to include the attached cover sheet, standard 330 Form, Commissioning Project Experience Listing form, along with any additional information considered appropriate. Please deliver one (1) hard copy of the submittal to La’Keya Hewlin at the address noted above along with one (1) digital submission (thumb-drive).

All submittals will be reviewed by the University Commissioner Evaluation Committee. Firms selected (and those not selected) for interviews will be notified at that time.

Please deliver all submittals to me at the address written above.

Sincerely,

William Finley

Project Manager

**The University of North Carolina at Charlotte**

**Friday HVAC & Controls**

**Building Commissioning Services**

**PROJECT DESCRIPTION:**

1. New BACNET controllers for all HVAC equipment

2. Upgrade chilled water and hot water bridge and controls (including new VFD’s for pumps)

3. Replace existing AHU-1 and AHU-2 with one single duct unit with fan wall (including associated VFD’s)

4. Replace rooftop air handling units (current design intent is to replace them 1 for 1 with similar unit size/capacity with new controls)

5. Replace 1st and 2nd floor dual duct VAVs with single duct VAVs with hot water reheat

6. Replace 3rd floor electric VAV’s with hot water VAV’s (to the extent construction budget allows)

7. Provide hot water distribution to new VAV reheat coils

8. Upgrade fire alarm system to current code on 1st and 2nd floor

9. Provide architectural support scope for building code summary and minor patch/repair work in support of scope of work outlined above.

**Additional components may be discovered and evaluated through the advance planning process (which is currently ongoing).**

The Design Engineer for this building is McKim & Creed. The project is currently in the Schematic Design phase. The selected commissioning firm members will be active advisors to the Project Team and provide “Enhanced Commissioning” in accordance with University requirements and Senate Bill 668 and provide M&V (Measurement and Verification) of the 1st year’s energy consumption.

**SCOPE OF SERVICES**

The Commissioning Authority (CxA) will serve as the University’s agent to commission all identified components in the Project. The CxA is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CxA may assist with problem solving or resolving non-conformance or deficiencies, but ultimately that responsibility resides with the construction manager and the engineering design team. The primary role of the CxA shall be to develop and coordinate the execution of a Commissioning Plan; observe and document the installation, checkout, start-up, and equipment and system testing to establish that equipment and systems are functioning in accordance with the requirements of the Contract Documents; and to assist in developing correct and complete documentation of the construction effort. **The CxA shall utilize a web application for managing the commissioning documentation associated with the project. A dedicated project site will be established, and this web application will provide real time data and a single interface for all project team members to share information and collaborate effectively.** The CxA shall support the architect with their preparation of the required building certification commissioning documentation, if applicable.

The Commissioning Team shall conduct a review of the Schematic Design and Design Development documents prior to the Construction Documents Phase, and shall conduct a separate review of the Construction Documents near completion of the Construction Document Phase.

**SYSTEMS TO COMMISSION**

Systems that shall be commissioned include mechanical, equipment; and systems to include building automation systems, exhaust and other specialty fans, and terminal units.

**COMMISSIONING TASKS**

The following tasks will be accomplished by the CxA to provide Commissioning during the design, construction and acceptance phases of the project. Reference Attachment A for listing of minimum formal written documents required.

**A. Design Phase**

The CxA shall advise and lead the owner and the Design Team in documenting the written Owner Project Requirements (OPR) and University design intent, and the Design Team’s Basis of Design (BOD) and rationale for accomplishing these requirements. The CxA shall also provide Design Team members with Commissioning items to be considered during design, perform a focused design review of the Schematic Design and Design Development Documents and Construction Documents (95% design stage), prepare Commissioning specifications for the construction bid documents for all systems and equipment that are to be commissioned and prepare draft of functional tests for equipment and systems to include in specifications.

**B. Construction Phase**

During the Construction Phase, the CxA will monitor construction progress to ensure that established commissioning objectives will be achieved. The CxA shall provide the following tasks during the construction phase:

* Conduct a Pre-construction Commissioning Meeting to review Commissioning scope, plan, and schedule with the Designer’s architect and engineering team, Construction Manager, Site Superintendents, and Project Managers and Superintendents of applicable subcontractors. Applicable subcontractors must include mechanical, electrical and plumbing.
* Coordinate the Commissioning work and, with the Construction Manager (CM), ensure that Commissioning activities are being scheduled into the Contractor’s Project Schedule.
* Review Bulletin Drawings and Shop Drawings and inform University in situations where Commissioning Objectives are at risk.
* Attend Designer’s Monthly Project Progress Meetings and address major issues which impact successful commissioning.
* Continue to update Commissioning Schedule and coordination throughout construction with CM and subcontractors.
* Continually update and modify Commissioning Plan based on actual construction and installed equipment, and distribute to University, Design Team and CM.
* Prepare final pre-functional and final functional test procedures for the equipment and systems.
* Review and approve TAB Execution Plan.
* Maintain a Construction Variance and Deficiency Log of any items observed to be a problem, poorly installed, or discrepancies.
* Verify accessibility and maintainability of all operable equipment with emphasis on equipment mounted in the ceiling.
* Witness a sample of pipe test and flushing procedure, sufficient to be confident that proper procedures are followed.
* Witness a sample of any ductwork testing and cleaning procedures, sufficient to be confident that proper procedures are followed.
* Witness a sample of checkout, TAB, end-to-end testing, and calibration of controls.
* Observe first Pre-functional Test of each type of system, including mechanical, controls, electrical, and specialty systems.

**C. Acceptance Phase**

Commissioning during the Acceptance Phase is required to demonstrate that performance of the installed equipment and systems meet the requirements of the Contract Documents and Commissioning Plan. The CxA shall complete the following tasks during the Acceptance Phase:

* Obtain copies of Pre-functional Reports from Contractor with sign-offs verifying that the systems have been checked out in compliance with the Commissioning Plan and manufacturers requirements. Check the accuracy of the TAB effort. Direct the TAB contractor to take sample readings and compare to TAB report.
  + - check 10% of the TAB report readings of diffusers, grilles, hoods, and terminal devices;
    - check 100% of the TAB report readings for main AHU’s, main pumps, and main exhaust fans;
    - document findings.
* Functional Testing shall be performed on all control loops to include terminal boxes, chilled and hot water control valves, and vfds.
* Witness Performance Testing of BAS Sequences of Operation
* Witness Functional Testing of each major piece of equipment to demonstrate that each item of equipment and system is operating according to the Design Intent and contract documents. Functional Testing shall include operating the system and components through each of the written sequences of operation.
* Assist in troubleshooting to resolve control problems as they are discovered.
* Check the system graphics to assure all specified graphics and associated trends are provided. Check a 10% sample of mapped points to assure reported data is consistent with actual data of monitored point.
* Commission all utility meters to include power, water, gas and BTU.
* Maintain a Functional/Performance Test Deficiency Log of any items found to be a problem, poorly installed, or discrepancies. Provide the log and test results to the Owner, Contractor, and ARCHITECT with recommended actions.
* Notify the Owner, CM and architect of the unacceptable findings if 10% of identical pieces of equipment fail to perform to the requirements of the contract documents.
* Review O & M documentation for completeness. This review shall be in parallel with the Design Team’s review of the O & M documentation for conformance to the project specification.
* Document the designer’s 1/2-day systems training to user staff on “how the building is supposed to operate”.
* Review, pre-approve, and document training of the university operating personnel by the contractor.
* Attend State Final Inspection.
* Perform seasonal testing checkout of equipment – in September for cooling systems and in January for heating systems.
* Provide three (3) hard copies and an electronic copy of the Commissioning management report (Commissioning Final Report). The report shall include an executive summary, list of participants and roles, brief building description, and the following sections:
* OPR
* Design Intent
* Basis of design
* Pre-functional checklists complete
* Functional checklists complete
* TAB reports
* System schematics
* Control strategies and set points
* Deficiency Log
* Guidelines for energy accounting
* Recommissioning manual

**D. M & V**

**Commissioning Scope**

* In each of the first four (4) quarters of the 1st year of occupancy, gather all measurement data from BAS. Summarize data in spreadsheet form and compare to final energy model submitted by designer.
* Identify any areas for investigation and forward spreadsheet and list of variances to Owner and Designer.
* Provide a summary report each quarter and a final annual summary. Final report to be submitted to Designer, Owner and SCO.

**Test Equipment**

The Contractor shall provide all tools or the use of tools as specified by the CxA in the Construction Documents that are required to start, checkout, and functionally test equipment and systems, except for identified testing with supplemental portable dataloggers, which shall be supplied and installed by the CxA.

Datalogging equipment, monitoring devices, specialized equipment, and software not required to be provided by the installing contractor in the Contract Documents, and provided by the CxA to monitor, confirm, or verify the contractor’s testing procedures, shall remain the property of the CxA. Equipment provided shall meet the minimum accuracy, calibration, and performance standards required by the specified Performance Test.

**EXPECTATIONS OF THE COMMISSIONING TEAM**

Members of the Commissioning Team must be capable of listening, comprehending and responding to University leaders who will give both general and specific guidance for desired project parameters. The team must have a principal-in-charge that is a Professional Engineer in the State of North Carolina, with other Engineers as appropriate that are also registered Engineers. Project managers, lead field Engineers, and field support staff may be non-Engineers who have the technical training, past field experience and skill in Commissioning, especially in the areas of TAB, HVAC operations, DDC systems and electrical system operations. The required expertise for this project must be part of the skill and experience set of the firm making the proposal. It is the university’s desire that the Commissioning Authority (CxA) satisfy as many of the following preferences as possible:

1. It is desirable that the CxA will have acted as the principal CxA for multiple projects over 100,000 square feet, and will have acted as principal CxA for a project of a similar type facility as the Project at hand.

2. The Commissioning team members should have extensive experience in:

A. operation and troubleshooting of HVAC systems,

B. direct digital control (DDC) systems,

C. lighting control systems, and

D. testing, adjusting, and balancing (TAB) of HVAC systems. Extensive (minimum of five years)

field experience is required for this type of work and systems.

E. Demonstrate experience commissioning systems in an occupied building.

F. Experience with HVAC, BAS control systems.

3. Team members have knowledge and experience in building operations and maintenance, and have provided O & M training.

4. Team members have experience in energy-efficient systems design, and control strategy optimization. 5. Team members have experience writing commissioning specifications and test procedures.

**BUDGET**

The construction budget for this project is approximately $6,790,000.

This sheet is to be the cover sheet for the submittal. If the submittal is bound in a binder, this will be the top sheet visible upon opening the binder cover.

**SUBMITTAL COVER SHEET**

**COMMISSIONING SERVICES**

**Friday HVAC & Controls**

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Commissioning Firm Engineer of Record

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Mechanical Engineering Firm Mechanical Engineer

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Electrical Engineering Firm Electrical Engineer

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Plumbing Engineering Firm Plumbing Engineer

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Other Firm